DOCUMENT RESUME

ED 355 040 PS 021 245

AUTHOR Britz, Joan
TITLE Problem Solving in Early Childhood Classrooms. ERIC Digest.
INSTITUTION ERIC Clearinghouse on Elementary and Early Childhood Education, Urbana, Ill.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO EDO-PS-93-1
PUB DATE 93
CONTRACT RI88062012
NOTE 3p.
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052) -- Information Analyses - ERIC Clearinghouse Products (071)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Classroom Environment; Curriculum Design; Decision Making; *Early Childhood Education; *Group Activities; *Learning Activities; *Problem Solving; Teacher Role; Teacher Student Relationship; Teaching Methods; *Young Children
IDENTIFIERS ERIC Digests; Student Cooperation

ABSTRACT

Problem solving is the foundation of young children's learning. The role of the early childhood teacher in facilitating problem-solving behavior in children involves trusting children's attempts to learn through problem solving and maintaining a classroom environment that encourages problem solving. Curricula that foster children's problem solving are those that encourage children's decision making, provide a framework for integrated learning, use a project approach to facilitate cooperative learning, and organize work through themes and units. Teachers can foster children's problem solving by providing enlarged blocks of learning time, rearranging classroom spaces to facilitate cooperation, and providing a variety of materials for children's use. A model of problem solving in an early childhood classroom involves four steps: (1) identifying the problem; (2) brainstorming solutions; (3) choosing and implementing one solution; and (4) evaluating the solution used. In order to determine whether a particular problem is appropriate for children, teachers can ask whether the problem is interesting, can be solved at a variety of levels, requires new decisions to be made, and requires a solution that can be evaluated. Encouraging children's problem solving in these ways equips them with a lifelong skill useful in all areas of learning. (BC)

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ERIC Clearinghouse on Elementary and Early Childhood Education
University of Illinois
805 West Pennsylvania Avenue
Urbana, Illinois 61801
(217) 333-1386

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ERIC Digest

EDO-PS-93-1

Problem Solving in Early Childhood Classrooms

Joan Britz

Problem solving is the foundation of a young child's learning. It must be valued, promoted, provided for, and sustained in the early childhood classroom. Opportunities for problem solving occur in the everyday context of a child's life. By observing the child closely, teachers can use the child's social, cognitive, movement, and emotional experiences to facilitate problem solving and promote strategies useful in the lifelong process of learning.

Learning Through Problem Solving

By exploring social relationships, manipulating objects, and interacting with people, children are able to formulate ideas, try these ideas out, and accept or reject what they learn. Constructing knowledge by making mistakes is part of the natural process of problem solving. Through exploring, then experimenting, trying out a hypothesis, and finally, solving problems, children make learning personal and meaningful. Piaget states that children understand only what they discover or invent themselves (1963). It is this discovery within the problem solving process that is the vehicle for children's learning. Children are encouraged to construct their own knowledge when the teacher plans for problem solving; bases the framework for learning in problem solving; and provides time, space, and materials.

The Teacher's Role

Changing through problem solving is modeled by adults (Bloom, Sheerer, and Britz, 1991) and facilitated by the teacher in the classroom environment. When teachers articulate the problems they face and discuss solutions with children, children become more aware of the significance of the problem-solving process. Being a problem solver is modeled by the teacher and emulated by the children. The teacher's role is two-fold: first, to value the process and be willing to trust the learner, and second, to establish and maintain a classroom environment that encourages problem solving. It is the attitude of the teacher that must change first in the problem-solving classroom. Values and goals must be clearly defined to include a child-centered curriculum, the development of communication skills, promotion of cooperative learning, and inclusion of diverse ideas.

The teacher must be willing to become a learner, too. By being curious, observing, listening, and questioning, the teacher shares and models the qualities that are valued and promoted by the problem-solving process.

Planning for Problem Solving

A curriculum that accommodates a variety of developmental levels as well as individual differences in young children sets the stage for problem solving (Bredekamp, 1987). Choices, decision making, and a curriculum framework that integrates learning, such as Katz and Chard's project method (1989), are especially appropriate for young learners. The project approach facilitates cooperative learning and promotes diverse ideas. Donna Ogle's K-W-L (what you KNOW, what you WANT to know, and what you have LEARNED) is another method of organizing work that promotes problem solving. Themes, units, webbing, and the KWL method are all ways of organizing curriculum that can support problem solving (Britz and Richard, 1992). Beginning with the needs and interests of the children, problem solving develops from meaningful experiences important to the children. The teacher-designed curriculum provides the classroom basis for these experiences.

For example, a second grade investigation of waste materials from a classroom led one group of young children to explore the topic in an integrated way. Reading, writing, counting, measuring, interviews of community people, and science experiments were planned, initiated, and reported. Solutions to many problems posed during the investigation were tried out and some were found to be successful. Through group work, individuals were able to participate and communicate as cognitive and social needs were met. Each child, at individual levels and in individual ways, was successful within the group experience. Problem solving empowers children.

Providing for Problem Solving

Problem solving is a skill that can be learned and must be practiced. It is facilitated by a classroom schedule that provides for integrated learning in large blocks of time, space for ongoing group projects, and many open-ended

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materials. The teacher provides the time, space, and materials necessary for in-depth learning.

- Time: Teachers can provide for problem solving by enlarging blocks of learning time during the school day. Because making choices, discussing decisions, and evaluating mistakes takes time, large time blocks best suit the problem-solving process. It is important that children know they have time to identify and solve problems.
- Space: Projects and group meetings may require an assessment of classroom space. Moving desks and tables together facilitates communication and cooperation in the classroom. Once the teacher has observed the patterns of traffic in the classroom, equipment can be moved or eliminated to promote problem solving.
- Materials: The open-ended materials that are needed for the construction and concrete solving of problems should be safe, durable, and varied. Well-marked storage units should be easily accessible to children, and materials should be available for ongoing exploration and manipulation. Access to a variety of materials encourages children to use materials in new and diverse ways. This freedom promotes problem solving.

The Problem-Solving Model

Individuals or groups can solve problems. Group problem solving is important to young children because many diverse ideas are generated. Both individual and group processes should be included in the early childhood classroom. Becoming skillful at problem solving is based on the understanding and use of sequenced steps. These steps are:

1. Identifying the problem,
2. Brainstorming a variety of solutions,
3. Choosing one solution and trying it out, and
4. Evaluating what has happened.

Often the most difficult of these steps is identifying the problem. If Bill cries, "Alice is hitting me," the problem to be solved is not the hitting but, rather, *the reason why* Alice is hitting Bill. Therefore, the investigation of solutions must relate to the cause of the problem instead of its effect. Brainstorming gives children practice in communication, negotiation, and cooperation skills. Learning to express individual ideas in a diverse society is important. By choosing and trying out a solution, learners develop empathy, come to consensus, and share the responsibility of the decision. These are valued learnings in a democratic society. Finally, by evaluating the problem-solving process, children assess their choices and mistakes and learn to be independent evaluators of their work.

The process of problem solving—making choices and learning from them—is facilitated by teachers who observe, listen, and ask open-ended questions that further the process: questions such as, "What will happen if...?" and "What other ways can you think of...?" Problem solving becomes a cycle of learning when mistakes are made and different solutions have to be tried. This discovery process allows children to construct their own learnings. Most problems have more than one solution; some problems cannot be solved. Experiences with these sorts of problems promote learning in young children.

Choosing Good Problems

Goffin (1985) provides teachers with guiding questions that will help them identify appropriate problems for young children. Some of these are:

- Is the problem meaningful and interesting?
- Can the problem be solved at a variety of levels?
- Must a new decision be made?
- Can the actions be evaluated?

Problem solving is a way to make sense of the environment and, in fact, control it. The process allows children in an increasingly diverse world to be active participants and to implement changes. By including problem solving in the early childhood classroom, we equip children with a lifelong skill that is useful in all areas of learning.

For More Information

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This publication was funded by the Office of Educational Research and Improvement, U.S. Department of Education, under contract no. OERI 88-062012. Opinions expressed in this report do not necessarily reflect the positions or policies of OERI.

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